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EXAMINER

ALI, MOHAMMAD M

ART UNIT PAPER NUMBER

3744

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Please find below and/or attached an Office communication concerning this application or proceeding.



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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/028,860
Filing Date: December 19, 2001
Appellant(s): KOENEMAN ET AL.

MAILED
JAN 26 2005
GROUP 3700

Anne Collette
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 08/16/04.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

The brief does not contain a statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief. Therefore, it is presumed that there are none. The Board, however, may exercise its discretion to require an explicit statement as to the existence of any related appeals and interferences.

(3) *Status of Claims*

Claims 8-11 and 17-26 have been allowed and claim 3 has been objected.

(4) *Status of Amendments After Final*

No amendment after final has been filed.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

Appellant's brief includes a statement that claims 1-9, 12-20, 22-29 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) *Claims Appealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) *Prior Art of Record*

5,396,403	Patel	03-1995
6,188,578	Lin et al.	02-2001(10)

Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 6-7, 12- 16 and 27-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Fujisaki et al. (5,763,950). Fujisaki et al. disclose a integrated circuit chips/package comprising an integrated circuit die having an active surface 11, and a cooling fluid /coolant 235 directly contact and move across the active surface 11, substrate 12, solder bumps 13, heat sink 32, interposer 12-2, internal pump/fan 133, and external pump 197 for flowing cooling fluid in the circuit. See Fig. 1, 20, 28, 33, 35, 37, 41, 42 and 43.

Claims 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujisaki et al. in view of Patel (5,396,403). Fujisaki et al. disclose the invention substantially as claimed as stated above. However, Fujisaki et al. do not disclose a coupling feature to both sides of an interposer by solder bumps. Patel teaches the use of a coupling feature to both sides of an interposer 61 by solder bumps 17 in an integrated circuit for the

purpose of making a thermal coupling between a upper active surface/conductive plate 63 and a lower active surface/conductive plate 67 of the integrated circuit. Patel also disclose an electrical cable 89 for power connection. See Fig. 1 and 4 Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the integrated circuit chips of Fujisaki et al. in view of Patel such that an a coupling feature of the interposer and solder bumps could be provided in order to thermally couple the active surfaces of the integrated circuit.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujisaki et al. in view of Patel as applied to claim 4 above and further in view of Lin et al. (6,188,578 B1). Fujisaki et al. in view of Patel disclose the invention substantially as claimed as stated above. However, Fujisaki et al. in view of Patel do not disclose an underfill material. Lin et al. teach the use of an underfill material 18 in an integrated circuit package for the purpose of serving an integrated circuit. See Fig. 1. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the integrated circuit chips of Fujisaki et al. in view of Patel and further in view of Lin et al. such that an underfill material could be provided in order to improve heat conductivity or heat flow out of the integrated circuit board 11.

Allowable Subject Matter

Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 8-11 and 17-26 are allowed.

Response to Arguments

Applicant's arguments, see remarks of amendment, page 8, filed 04/06/04/04, with respect to the rejection(s) of claim(s) 1-7, 12-16 and 27-29 under 35 U. S. C. 102(3) and 35 U. S. C. 103(a) have been fully considered and are not persuasive. The Applicant argued, "Fujisaki does not disclose cooling fluid to directly contact and move laterally across the active surface (emphasis added) of claim 1. Accordingly, the Examiner has not met his burden of prima-facie showing of anticipation of claim 1 under U. S. C. 102(b) in view of Fujisaki. Accordingly, the rejection of claim 1 under 35 U. S. C. 102(b) in view of Fujisaki is improper and claim 1 overcomes the rejection under U. S. C. 102(b) in view of Fujisaki. Claims 2-3 and 6-7 depend from Claim 1 and are allowable over the teachings of Fujisaki for at least the same reason as pertains to Claim 1." It is clear from Fig. 37 of Fujisaki that cooling fluid 235 enters the sealed container 231 at one side and leaves the container at other side at 236. While entering the container, fluid 235 definitely hits semiconductor 11 before it hits any other objects like partition member 220 in the container. It is not the partition member, which is diverting or influencing the whole fluid flow through the container 231, it is a driving member, which generates and causes the fluid flow through the container 231. The partition member may have a partial role to effect the fluid flow through the container but the major portion of fluid flow is being controlled by the generator and thus the major portion of the fluid is directly hitting the semiconductor and flowing laterally through the

container. Therefore, Fujisaki meets the limitations of Claim 1 and thus meets the limitations of Claims 12 and 27. Therefore, rejections are proper.

Fig. 37 constructionally teaches the claimed subject matter. Moreover, Fujisaki describes for Fig. 37 and 38, "Before passing inside the sealed container 231 and reaching an outlet 236 a coolant 235 hits the partition members 220 and forms the two-dimensional jet flow on the downstream side of each partition member 220. Hence, the semiconductor elements 11 are efficiently cooled. In other words, this first modification can utilize the high cooling efficiency of the jet flow and also increase to the limit the mounting density of the semiconductor elements 11 within the electronic equipment." The two dimensional jet flow as mentioned above does not indicate that there is no direct contact of the semiconductor 11 by the fluid 235 and no lateral flow of the fluid 235 through the container 321. Whatever may be the function of the partition member 220 a portion of fluid 235 is always directly contacting the semiconductor 11 and flowing through the container 231 before leaving at the outlet 236. Therefore, the rejections are proper.

For the above reasons, it is believed that the rejections should be sustained.

Application/Control Number: 10/028,860
Art Unit: 3744

Page 7

Respectfully submitted,

Ma

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December 28, 2004

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